Becker in Leipzig, Dr. Fränkel in Berlin, and Dr. Frank in Naples. These are all members of the younger generation of instructors, and are adepts in the laboratory methods of Koch. Dr. Fischer's original work has been exerted in two directions chiefly, — one in the application of bromine to disinfection, another in the study of the phosphorescence of the sea.

ELECTRICAL NEWS.

NEW FORM OF GAS-BATTERY. — This battery, invented by Mr. Ludwig Mond and Dr. Carl Langer, is an improvement on the gas-battery invented by Grove fifty years ago, which produces electricity from hydrogen and oxygen gas by the intervention of platinum. The distinguishing feature of the new battery, which has been designed to obtain large currents of electricity by means of these gases, is, according to *Nature*, that the electrolyte is not employed as a mobile liquid, but in a quasi-solid form, and it is therefore named "dry gas battery." Each element of the battery consists of a porous diaphragm of a non-conducting material,— for instance, plaster-of-Paris, — which is impregnated with dilute sulphuric acid. Both sides of this diaphragm are covered with very fine platinum-leaf, perforated with very numerous small holes, and over this with a thin film of platinum black. Both these coatings are in contact with frameworks of lead and antimony, insulated one from the other, which conduct the electricity to the poles of each element. A number of these elements are placed side by side, or one above the other, with non-conducting frames intervening, so as to form chambers through which hydrogen-gas is passed along one side of the element, and air along the other. One element, with a total effective surface of 774 square centimetres (120 square inches), which is covered by 1 gram of platinum black and .35 of a gram of platinum-leaf, shows an electro-motive force of very nearly 1 volt when open, and produces a current of 2 ampères and .7 of a volt, or 1.4 watts, when the outer resistance is properly adjusted. This current is equal to nearly 50 per cent of the total energy obtainable from the hydrogen absorbed in the battery. The electro-motive force decreases, however, slowly, in consequence of the transport of the sulphuric acid from one side of the diaphragm to the other. In order to counteract this disturbing influence, the gases are from time to time interchanged. The battery works equally well with gases containing 30 to 40 per cent of hydrogen, such as can be obtained by the action of steam, or steam and air, on coal or coke, if the gases have been sufficiently purified from carbonic oxide and hydrocarbons. The water produced in the battery by the combination of hydrogen and oxygen is carried off by the unconsumed nitrogen, and an excess of air carried through it for this purpose.

BOOK-REVIEWS.

Education in the United States: its History from the Earliest Settlements. (International Education Series.) By RICHARD G. BOONE. New York, Appleton. 12°. $1.50.

THIS book belongs to a class that are becoming rather common in this country, books presenting a large amount of useful information in an unattractive style. The time has been when a good literary style was considered indispensable in an historical work; but in our time, and especially in this country, we are treated to volume after volume on historical themes in which style is utterly lacking. That this should be so is somewhat surprising; for a work that has no charm of style is certain to have a much smaller circle of readers than one that has that attraction, and writers usually desire as many readers as possible. In Mr. Boone's book we are sorry to find this literary defect; for the work has a good deal of merit of other kinds, conveying as it does a large amount of information for the most part well arranged. It has evidently been prepared by careful and conscientious study of the original authorities, and will be useful at least to all educators and as a work of reference to all intelligent readers. It opens with an account of the steps taken by the early colonists to establish schools and colleges, and shows how, at the very outset of our national history, the sentiments of North and South differed on this subject of education. Massachusetts and Connecticut led the way in founding schools for the whole people, and it was not until comparatively recent times that their ideas and practice became generally prevalent. How the public-school system grew up and overspread the country, Mr. Boone relates at considerable length; and he does not fail to show how much the schools have been improved by the increase of State control. Then follows a chapter on recent progress in the colleges, showing the changes in the curriculum, the introduction of the elective system, and other matters of interest. Professional and technological schools are also treated of, and there is a chapter on the education of the deaf and dumb and other unfortunates, and of criminals. The author does not confine himself, however, to the schools alone, but gives the history of other educational agencies, such as libraries, museums, and learned societies. The founding of the Smithsonian Institution, the grants of land for educational purposes, and other acts of the general government bearing on education, are related; and the book closes with an interesting chapter on the advance that has been made in the education of women. Thus it contains a valuable mass of information, which, so far as we know, was not accessible before in a convenient form.

A Theoretical and Practical Treatise on the Strength of Beams and Girders. By ROBERT H. COUSINS. New York, Spon. 12°. $5.

SINCE the time of Galileo, the subject of which this volume treats has received much attention at the hands of the ablest mathematicians of all countries. Many attempts have been made during the present century to solve experimentally the problems involved, only to result in the adoption, by many experimenters, of empirical rules for the strength of beams and girders, rather than scientifically deduced formulas; the reason for this, as given by one authority, being that "no theory of the rupture of a simple beam has yet been proposed which fully satisfies the critical experimenter." The theory advanced in this treatise, and the formulas resulting from that theory, deduce the strength of beams and girders from the direct crushing and tensile strength of the material composing them, leaving out of the problem altogether the co-efficient known as the modulus of rupture. The theory and the formulas deduced from it are in accord with correct mechanical and mathematical principles, and the author believes that they will fully satisfy the results obtained by the experimenter. Works of this character derive special importance from the constantly increasing use of iron and steel for building and engineering purposes.

The Beginners' Book in German. By SOPHIE DORIOT. Boston, Ginn. 12°. 90 cents.

THIS little book is the result of the need felt by the author and others, in teaching German, of suitable books to put into the hands of beginners. It consists of two parts. Part I. is a series of lessons, each of which is introduced with a picture, followed by corresponding verses from the child-literature of Germany. These pictures, which illustrate the text following, were all drawn expressly for the purpose, and are brimming with the spirit of fun and humor which they have so faithfully caught from the child-lore. A conversation upon the subject, with the study of words and phrases, completes each lesson. In this way advantage is taken of the children's tastes and inclinations, and even of the mischief-loving element which enters so largely into the child-nature. The second part contains graded selections for reading.

The typography and make-up are in every way excellent. The book, as a whole, forms a very attractive volume, and we have no doubt that it will prove, as the author has intended, a great relief to teachers and a source of pleasure to pupils.

The A B C of Electricity. By WILLIAM H. MEADOWCROFT. New York, F. W. Lovell. 12°. 50 cents.

CONDENSATION of matter and simplicity of language are the points most noticeable in this little volume. A brief general outline of the rudiments of electrical science, or at least of those departments of it which have now become almost a part of every-day life, is given in language devoid of those technicalities which are